SPECIFICATION

DETERGENT MADE USE OF FERMENTATION TECHNOLOGY AND PRODUCTION METHOD THEREOF

Technical Field

[0001]

The present invention relates to soap which enhances a saponification degree of fat and strengthens a cleaning power by adding effective microorganisms (EM) and EM-X ceramic powder in a production process of soap, and which proliferates effective microorganisms in sewage water after washing for cleaning the sewage water.

Background Art

[0002]

The conventional water treatment has employed a method for collecting sewage in cleaning equipment or a sewage treatment plant for treating sewage. However, household miscellaneous waste water contributes largely to a main reason for pollution. Household miscellaneous waste water contains various substances. Among them, there is concern that detergent could provide an adverse affect to an ecological system. In particular, various surfactants contained in a synthetic detergent remarkably harm the existence of bacteria and protozoa as a main body in a sewage treatment technique, which lowers the treatment capacity and leads a vicious circle of increase in

pollution. Moreover, in a final process of sewage treatment, many chlorine type bactericides are used, thus influence to an ecological system becomes serious.

[0003]

Considering that the household miscellaneous waste water including surfactants lowers the treatment capacity of the sewage treatment plant and chlorine type bactericides are being used, it can be said that an intermediate treatment process in the sewage treatment plant, etc. would not be sufficient to a basic solution.

[0004]

Recently, accumulation of the above problems causes serious pollution of rivers and oceans, and with an expensive cost the recovery has been tried. However, these problems are left unsolved, rather become more serious. In such situations, people's attention has been drawn to soap that is decomposed by natural microorganisms, and a public movement to use soap made from waste oil has been growing. However, when soap has a low saponification degree and an insufficient cleaning power, it is apparent that water quality is deteriorated in accordance with increase of soap usage.

Patent reference 1: Japanese Unexamined Patent Publication 2002-226893

Patent reference 2: Japanese Unexamined Patent Publication 2002-128683

Disclosure of the Invention

Problem to be solved by the invention

[0005]

An object of the present invention is to reduce soap usage by enhancing a saponification degree of fat and strengthen its cleaning power, so that pollution process from sewage water is disconnected fundamentally. In other words, the invention is characterized in that soap with enhanced saponification degree is produced by adding effective microorganisms (EM) which is effective for water purification and using EM-X ceramic powder as a catalyst.

In a production of detergent of the present invention, the following are added:
effective microorganisms (EM) mainly consisting of lactic acid bacteria, yeast and photosynthetic bacteria (EM: trademark of EM Research Organization Inc.) among anaerobe effective microorganisms as effective microorganisms (EM); and
ceramic powder (EM-X ceramic: manufactured by EM Sogonet Co., Ltd., Amron Co., Ltd.) which is prepared by mixing a condensed liquid of antioxidant substances produced by effective microorganisms (EM) (EM-X: manufactured by Tropical Plant Resources Research Institute; trademark of EM Research Organization Inc.) and EM in a clay, aging, and baking at 800-1200°C.

The detergent thus produced aims to enhance a

saponification degree, include functionality and effective component of microorganism, and exhibit an effect as a water purification material after washing.

Means to solve the Problem

[0006]

The present invention is characterized in that, on selecting microorganisms, in particular, effective microorganisms (EM) is introduced in a production process of soap as a living organism playing a starter role in an environmental purification process. EM mainly consists of facultative anaerobic lactic acid bacteria, yeast and photosynthetic bacteria. In the present invention, by introducing EM particularly before and after saponification process in a production process of soap, a treated material obtained according to the present invention exhibits an environmental purification effect as a substrate of benign microorganism or a microorganism material.

[0007]

Ordinarily, decomposition of organism discharged to environment starts in an artificial purification process conducted in purification equipment or a sewage treatment plant, and self-purification operation. However, by utilizing a treated material of the present invention, proliferation of benign microorganisms is accelerated immediately after use, and malign microorganisms using the treated material and sewage water discharged in washing

as a nutrient have no chance to proliferate.

[0008]

Moreover, the present invention utilizes facultative anaerobic effective microorganisms. Basically, in environmental purification technologies, there are many cases using aerobic microorganisms, Bacillus genus is the typical example as described in Japanese Unexamined Patent Publication 2002-226893. Microorganisms composing an ecological system are roughly classified into two sorts, one is an aerobic microorganism, and the other is an anaerobic microorganism. It is said that aerobic microorganisms occupy almost all of the earth and anaerobic microorganisms occupy the very small portion. Anaerobic microorganisms themselves are classified into obligatory anaerobic bacteria and facultative bacteria. Obligatory anaerobic bacteria cannot live under coexistence with oxygen. On the other hand, facultative bacteria are susceptible to oxygen but are of a microorganism group having a metabolic system capable of growing even under existence of oxygen. Effective microorganisms (EM) used in the present invention is the latter bacteria group among anaerobic bacteria, which can act even under coexistence with oxygen.

[0009]

A role of the foregoing facultative bacteria under an aerobic environment is as follows. Although mainly an active body under an aerobic environment is aerobic

bacteria, facultative anaerobic bacteria work together in almost all the cases of the backgrounds. In addition, many of facultative anaerobic bacteria have a wide environmental adjustability and independent alibility. Although the proliferation speed of facultative anaerobic bacteria is not so high as aerobic bacteria, the facultative anaerobic bacteria has a feature that it proliferates irrespective of the influence of environmental factors. Moreover, a lot of microorganisms are confirmed such that they contribute to decomposition of persistent materials of which aerobic bacteria can not realize the decomposition, they are particularly said to be an essential factor for environmental purification.

[0010]

Then, in order to conduct environmental purification easily, effective microorganisms (EM) consisting mainly of lactic acid bacteria, yeast and photosynthetic bacteria group which are facultative anaerobes has been widely used. In the present invention, as described in claim 1, by compounding EM and EM-X ceramic powder in a detergent, there can be realized a detergent characterized in that a saponification degree and cleaning power are enhanced, the amount of detergent used is reduced, functionality and effective component of the microorganisms are contained, and environmental load is small.

[0011]

In other words, on the occasion of discharging a detergent of the present invention into environment, effective microorganisms contained in soap naturally proliferate by utilizing sewage water discharged during the washing process as a nutrient in an early stage, and due to an effective component not contained in an ordinary detergent, the sorts of microorganism capable of employing the present soap as a nutrient increase, which contributes to the accelerated decomposition of soap itself. Further, when anaerobic bacteria are contained in the proliferated microorganisms, from the characteristic that respective anaerobic bacteria live together, various enzymes are produced in the decomposition process of organic matter. Furthermore, from a phenomenon called concurrent metabolism decomposing substances other than a target substance, they will contribute to the decomposition of environmental pollution causing substances other than the target.

Effect of the Invention

[0012]

As described above, a treated material obtained according to the present invention not only changes sewage water as a pollution source of environment to a purification source automatically, but also suppresses proliferation of various bacteria, which leads to a secondary effect on suppression of slippery touch in a sink

or bath tab, and of generation of bad odor substances.

[0013]

In addition, a detergent according to the present invention contains a lot of effective substances produced in a fermentation process of organic matter by facultative anaerobic bacteria, therefore, users can obtain not only positive effects of effective components but also an effect of returning indigenous microorganisms in environment to a sound state due to the excellent activation capability of benign microorganisms.

[0014]

On the other hand, fats as a raw material subjected to a fermentation treatment by effective microorganisms can be used as a raw material for detergents other than for soap like shampoo and as a moisture retention agent, so that the application is not restricted to detergent.

Best mode carrying out the Invention

[0015]

Next, a detergent that effective microorganisms are added according to the present invention and its preparation method will be described in detail.

[0016]

The term "effective microorganisms" as intended to use in the present invention means microorganisms used in food processing for working effectively for human, and they are a group of effective microorganisms (EM) of compound

culture mainly of lactic acid bacteria, yeast and photosynthetic bacteria which are generally recognized as safe bacteria. These have an effective fermentation pattern for human as a metabolic form of organic matter. A typical example of the common type of the microorganisms includes EM-1 (trademark of EM Research Organization Inc.), which is used in the present invention. EM-X ceramic powder used as a catalyst so as to enhance a saponification degree is commercially available one manufactured by EM Sogonet Co., Ltd. and Amron Co., Ltd.

[0017]

Since a detergent of the present invention is directed to soap, Examples 1 to 3 describe an introduction method into a production process of soap, but basically for the purpose of addition as a raw material, it can be used for all kinds of detergents. However, for a synthetic detergent containing a strong surfactant that kills microorganisms, it would kill microbes and protozoa in environment even if effective microorganisms (EM) of the present invention have resistance properties thereto. Therefore, it is not desirable to add effective microorganisms (EM) and EM-X ceramic powder in expectation of their water purification.

[0018]

Next, production methods will be described in detail.

Example 1

[0019]

FIG. 1 is one example of flow chart of solid form soap production method, in a pre-stage prior to an emulsification process, EM or a fermented material with EM, and EM-X ceramic powder are added.

[0020]

In this case, although the microorganisms added cannot be counted from soap as a viable cell, after using detergent, effective components contained therein become a nutrient for benign indigenous microorganisms present in environment, so that organic carbons in soap are rapidly decomposed.

[0021]

A most simple production method is a method that EM-1 is added as a raw material, alternatively, a material fermented with EM can be used. An example of the fermented materials is aqueous fermented molasses or rice rinsed water. Also, extracts of various organics and various minerals can be directly added, but, before addition, fermentation by EM can afford the same effect as the addition of EM-1. Through the above processes, various fermentation substances can be added, and additives are studied according to the purpose of use. However, if all raw materials are treated by fermentation for addition, it is not realistic because time, space and cost saving are not obtained.

[0022]

A basic production method is as follows. The effective results are obtained by replacement of EM-1 for all of water used, in consideration of cost, a sufficient effect can be obtained by addition of EM-1 and EM-X ceramic powder of 1%. In the case of compounding additives other than those, the amount is not required in exceeding EM-1 for addition.

[0023]

Addition of EM-X ceramic powder is to aim at enhancing a saponification degree by the catalytic activity. Table 1 shows the amount of soap portion formation depending on loadings of EM-X ceramic powder. As shown in Table 1, with increasing in loadings of EM-X ceramic powder, the amount of soap portion formation was increased.

[Table 1]

Influence of loadings of EM ceramic powder on the amount of soap portion formation

	No addition	0.01% addition	0.1% addition	1% addition
Cold water	1.552g	1.449g	1.592g	1.642g
Hot water	1.446g	1.376g	1.489g	1.550g

Example 2

[0024]

FIG. 2 is one example of liquid soap production method. After saponification, EM-1 or a secondary culture liquid

of EM-1, or a fermented rice rinsed water, which is a high nutrition liquid can be added to produce a liquid soap. A treatment prior to saponification follows Example 1.

[0025]

Table 2 is a table that the number of microorganisms contained in finished soap was counted. As shown in Table 2, when microorganisms are added after saponification, viable cell count is possible.

[Table 2]

Number of microorganisms in soap

Sort	Yeast	Lactic acid bacteria
Ordinary soap	Not detected	Not detected
EM added soap	10×10^4	15×10^4

Example 3

[0026]

Further, there are methods such as a direct fermentation method of raw materials and a method providing fat with antioxidant power by adding a fermented material to fat. Specifically, as described in Japanese Unexamined Patent Publication 2002-128683, a material that rice bran is fermented by EM is used. However, in Japanese Unexamined Patent Publication 2002-128683, aerobic microorganisms are used and utilized as an aqueous solution, but a primary

object of the present invention is that hydrophobic antioxidant substances being present more than water-soluble antioxidant substances in a fermented product are integrated into fat. When raw materials are directly fermented, EM-1 will be used, on this occasion, acceleration of fermentation can be done by conducting monosaccharides like glucose as a substrate. Also, even without addition of substrate, by adding EM-1 or fermented substances generated in accordance with it, and setting an aging period of about 45-90 days, the fermentation treatment of raw material is possible.

[0027]

Next, environmental purification effects will be described in detail.

Example 4

[0028]

A treated material according to the present invention was added into a water tank whose bottom part was bedded with soil being filled with tap water. Table 3 shows that respective additive materials were added thereto, then, changes of turbidity were followed in time axis. As shown in Table 3, compared to a synthetic detergent or soap without EM, in the water tank that the product of the present invention was added, the lowering of turbidity was observed from 4 days afterward, and the results that a high transparent state was maintained long time were

obtained.

[Table 3]

Influence of additive materials on turbidity [FAU]

Additive	4 days	13 days	20 days
No addition	69.7	45.3	41.3
Surfactant [synthetic detergent]	44.0	37.3	39.3
Soap	24.0	28.7	40.0
EM added soap	14.0	20.7	26.7

Industrial Applicability

[0029]

As describe above, the present invention can contribute to the purification of global environment because, in a production step of soap, by addition of an effective microorganisms (EM) and EM-X ceramic powder, a saponification degree of fat is enhanced, a cleaning power is strengthened as well, and it becomes possible in proliferating effective microorganisms in sewage water after washing and cleaning the sewage water.

Brief Description of the Drawings

[0030]

[FIG. 1] FIG. 1 is a flow chart of production method of solid form soap according to the present invention.

[FIG. 2] FIG. 2 is a flow chart of production method of liquid soap according to the present invention.